MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

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W. H. MAW, Esq., PRESIDENT, in the Chair.

John de Fenton, Ph.B., Seymour Avenue, Parktown, P.O. box 1050, Johannesburg, South Africa;
John Grigg, The Observatory, Thames, New Zealand; and
Robert Leetham Jones, M.A., 3 King's Bench Walk, Temple, E.C.,

were balloted for and duly elected Fellows of the Society.

Professor Julius Franz, Observatory, Breslau, Germany, was balloted for and duly elected an Associate of the Society.

The following Candidate was proposed for election as a Fellow of the Society, the name of the proposer from personal knowledge being appended :—

Alexander Davidson Fleming, Artillery Mansions, 75 Victoria Street, S.W. (proposed by the Rev. D. Fleming).

Sixty-seven presents were announced as having been received since the last meeting, including, amongst others :—

Sir W. Huggins, The Royal Society, presented by the author; Report on the Geodetic Survey of Rhodesia, presented by Sir D. Gill; 18 charts of the Astrographic Chart of the Heavens, presented by the Royal Observatory, Greenwich; and 10 charts presented by the San Fernando Observatory.

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On Mr. Cowell's Discussions of Ancient Eclipses of the Sun.

By Simon Newcomb.

In his various papers discussing Greenwich observations of the Moon, Mr. Cowell has made so important a step in advance in the method of deriving results from a long series of observations, and in unravelling the intricate network of mutual relations between the quantities he has to investigate, that any conclusion he reaches in this field must carry great weight. This fact seems to render it all the more desirable to make a critical examination of his conclusions when his methods seem so open to question as do those adopted in his two papers, "On the Secular Acceleration of the Moon's Longitude and Node" and "On the Secular Acceleration of the Earth's Orbital Motion" (*Monthly Notices*, vol. lxv. p. 861 and vol. lxvi. p. 3).

I begin with a glance at the available material. Historical research has brought to light some forty or more records or statements, extending between B.C. 1069 to A.D. 200, which may be considered with a greater or less degree of probability to refer to eclipses of the Sun. In most cases the conclusion that an eclipse is referred to is undoubted; the other cases range through every degree of doubt from plausibility to absolute uncertainty. The date is frequently so doubtful that the identification of an eclipse is more or less uncertain, even when granted that an eclipse was referred to.

Several recent investigators, Airy, Hansen, Oppolzer, Ginzel, and now Cowell, have investigated various selections, generally from three to five, of these eclipses with a view of deriving corrections to the secular motions of the Moon's elements. But there is no agreement between any two of the authors except, perhaps, Airy and Hansen; and no one of the results agrees with conclusions derived from modern observations by the aid of gravitational theory. Yet there is no reason to impugn the correctness of the narrative when we measure correctness by the standard of the historian. As I have said, in the majority of cases the eclipse is so far identified as to show that the statement of the historian was well founded. But it does not follow from this that the eclipse can be utilised for any astronomical purpose. As I have repeatedly pointed out, there being no observations of times or phases, the only fact we can take as the base of a conclusion is that a well-identified eclipse was total at a known place. By a curious fatality there is always some weak point in each of the small number of cases in which this condition is presumably satisfied by the narrative. In other cases the (as it seems to me) gratuitous assumption has to be made that the eclipse was total at the point where the record was discovered, or where the historian was supposed to have lived.

In the *Monthly Notices*, vol. lxv. p. 61, Mr. Cowell discussed five of these thirty or forty eclipses, and found, on the assump-